Name: _____ **Electrical Trades**

Directions:
Evaluate the student by checking the appropriate number to indicate the degree of competency.

Rating Scale (0-6):

- **0 No Exposure** – no experience/knowledge in this area; program/course did not provide instruction in this area
- **1 Unsuccessful Attempt** – unable to meet knowledge or performance criteria and/or required significant assistance
- **2 Partial Demonstration** – met some of the knowledge or performance criteria with or without minor assistance
- **3 Knowledge Demonstrated** – met knowledge criteria without assistance at least once
- **4 Performance Demonstrated** – met performance criteria without assistance at least once
- **5 Repetitive Demonstration** – met performance and/or knowledge criteria without assistance on multiple occasions
- **6 Mastered** – successfully applied knowledge or skills in this area to solve related problems independently

NOTE:
* = Core competencies (essential for the first day on the job).

0	1	2	3	4	5	6	**A. Appreciate and apply all personal and workplace safety procedures**	**Notes:**
							*1. Apply safety rules and regulations	
							*2. Apply safe practices when working with electricity	
							*3. Apply proper personal safety procedures, e.g., clothing, jewelry, personal grooming	
							*4. Identify techniques and practices of fire prevention	
							*5. Demonstrate appropriate first aid and CPR procedures	
							*6. Apply safe use of tools and related power equipment	
							*7. Apply techniques of lifting	
							*8. Apply ladder safety	
							9. Identify the effects of prescription drugs, nonprescription drugs, and controlled substances on job performance	
							10. Identify sources of help when dealing with substance abuse	
							11. Use material safety data sheets (MSDS) to identify and properly handle hazardous materials (e.g., cleaning fluids, transformer oils)	
							*12. Identify and comply with lock-out /tag-out procedures	
							13. Explain general OSHA requirements for job site safety	
							Other:	

0	1	2	3	4	5	6	**B. Apply basic applied academic skills to the electrical trades**	**Notes:**
							*1. Perform addition, subtraction, multiplication, and division; other number sense, including numeration and estimation; and apply these operations and concepts in the workplace and other situations	

							*2. Demonstrate geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformation of shapes	
							*3. Demonstrate problem-solving abilities	
							*4. Identify patterns and relationships within and among mathematical concepts, e.g., Ohm's law wheel	
							*5. Solve algebraic and geometric equations	
							*6. Utilize mathematical systems (including real numbers, whole numbers, integers, fractions, decimals, percentages), geometry and number theory (including primes, factors, exponents, multiples)	
							*7. Interpret graphs, tables, charts, and matrices	
							*8. Convert values and measurements from English to metric	
							*9. Speak and write in standard English (including grammar, usage, punctuation, spelling, capitalization)	
							*10. Read and evaluate technical material	
							*11. Write formally (such as technical reports), and informally (such as outlines and notes)	
							*12. Interpret and implement written and oral instruction in individual or group activities	
							13. Participate in formal and informal presentations and discussions of issues and ideas	
							*14. Select and use test equipment, including analog and digital instruments, to make and record direct measurements	
							15. Analyze and document the changes within a system when inputs, outputs, and interactions are altered, e.g., hermetic compressors, PLC	
							*16. Demonstrate basic computer skills	
							Other:	

0	1	2	3	4	5	6	**C. Apply basic electrical theory to construct circuits and solve electrical circuit problems**	**Notes:**
							*1. Describe the scientific theory of electricity as it relates to basic chemical, static and magnetic forms	
							*2. Distinguish between volts, ohms, amps, and watts and their interrelationships in an electrical circuit	
							*3. Identify the characteristics of alternating current and direct current	
							*4. Solve electrical circuit problems using Ohm's Law	
							*5. Solve electrical circuit problems using Watt's Law	
							*6. Demonstrate problem-solving using Kirchhoff's Law	
							*7. Construct a series circuit	

							*8. Solve for unknown values of a parallel circuit (e.g., amperage, voltage, resistance, wattage, reactance)	
							*9. Construct a parallel circuit	
							*10. Solve for unknown values of a parallel circuit (e.g., amperage, voltage, resistance, wattage, reactance)	
							*11. Construct a series-parallel circuit	
							*12. Solve for unknown values of a series-parallel circuit (e.g., amperage, voltage, resistance, wattage, reactance)	
							*13. Solve power factor problems	
							14. Identify the existence of third order harmonics	
							Other:	

0	1	2	3	4	5	6	**D. Describe and safely interact with all electrical trades systems, including equipment, tools, and supplies**	**Notes:**
							*1. Cut and ream conduit	
							*2. Bend conduit to predetermined specifications using conduit bender	
							*3. Identify and operate common hand tools (e.g., hacksaw, screwdrivers, pliers, pocket knife, tape measure)	
							*4. Cut wire and cable	
							*5. Identify and operate common electrical power tools	
							*6. Identify and operate common hydraulic power tools	
							*7. Read and distinguish information from motor and motor controller nameplates	
							*8. Read and distinguish information from a transformer	
							Other:	

0	1	2	3	4	5	6	**E. Demonstrate trade requirements using appropriate codes**	**Notes:**
							*1. Demonstrate residential wiring requirements using the National Electrical Code (NEC) as a reference	
							*2. Demonstrate commercial and industrial wiring requirements using the NEC as a reference	
							*3. Comply with local electrical codes	
							*4. Identify job classifications and prerequisites for employment	
							*5. Sketch and diagram electrical systems	
							Other:	

0	1	2	3	4	5	6	F. Interpret designs, drawings, and specifications	Notes:
							*1. Identify trade symbols used in electrical drawings	
							*2. Identify basic architectural and mechanical symbols	
							*3. Interpret blueprints and specifications	
							*4. Identify residential construction components (e.g., studs, trusses, plates)	
							*5. Identify commercial and industrial construction components (e.g., steel studs, suspended ceilings)	
							6. Estimate and calculate construction costs	
							7. Complete as-built drawings to document installation	
							Other:	

0	1	2	3	4	5	6	G. Identify electrical materials and supplies	Notes:
							*1. Identify boxes used in electrical construction	
							*2. Identify devices commonly used in electrical construction	
							*3. Identify covers and plates used in electrical construction	
							*4. Identify common supports, anchors, and fastening devices	
							*5. Identify common screws, bolts, nuts, and nails	
							*6. Identify common connectors, terminals, and lugs	
							*7. Identify types of conduit and fittings	
							*8. Determine insulation properties and size of electrical wire	
							*9. Identify common load center accessories	
							*10. Identify parts and functions of a fusible load center	
							*11. Identify parts and functions of a breaker load center	
							*12. Identify interior configurations of single-phase and three-phase panels	
							Other:	

0	1	2	3	4	5	6	H. Calculate and install basic residential and commercial circuits	Notes:
							*1. Calculate service entrance loads	
							*2. Identify components and installation procedures for basic single-phase service entrance	
							*3. Install a basic single-phase service entrance	
							4. Identify components and installation procedures for basic three-phase service entrance	
							5. Install a basic three-phase service entrance	

							*6. Diagram and install a single-pole switching system	
							*7. Diagram and install a three-way switching system	
							*8. Diagram and install a combination three-way and four-way switching system	
							*9. Diagram and install a GFCI (ground-fault circuit interruptor) system using the NEC	
							*10. Diagram and install small appliance circuits	
							*11. Diagram and install special circuits, e.g., 240 volt	
							*12. Diagram and install special appliance circuits, e.g., 120 volt	
							*13. Design and install a residential lighting system	
							14. Design and install a commercial lighting system	
							*15. Diagram and install a multi-wire branch circuit	
							16. Diagram and install a doorbell system	
							17. Diagram and install a limited energy, low-voltage communication system	
							*18. Diagram and install a smoke detector system	
							*19. Calculate and install a grounded circuit conductor	
							*20. Calculate and install equipment grounding conductor	
							21. Identify the functions, operation, characteristics, and installation of fiber optic cable	
							Other:	

0	1	2	3	4	5	6	**I. Measure/troubleshoot electrical systems using industry-recognized devices**	**Notes:**
							*1. Perform logical steps of troubleshooting on electrical systems	
							*2. Identify safety techniques established for the use of test equipment	
							*3. Measure voltage using a voltage tester	
							*4. Measure current using a clamp-on ammeter	
							*5. Measure voltage, current and/or resistance using an analog multimeter	
							*6. Measure voltage, current and/or resistance using a digital multimeter	
							*7. Verify installation using a receptacle polarity tester	
							*8. Verify the operation of a ground-fault circuit interrupter using a GFCI tester	
							*9. Troubleshoot basic electrical devices and components	
							10. Verify three-phase rotation using phase rotation meter	

							Other:	

0	1	2	3	4	5	6	J. Demonstrate leadership skills in the classroom, industry, and society	Notes:
							1. Demonstrate an understanding of VICA, its structure, and activities	
							2. Demonstrate an understanding of one's personal values	
							3. Perform tasks related to effective personal management skills	
							4. Demonstrate interpersonal skills	
							5. Demonstrate etiquette and courtesy	
							6. Demonstrate effectiveness in oral and written communication	
							7. Develop and maintain a code of professional ethics	
							8. Maintain a good professional appearance	
							9. Perform basic tasks related to securing and terminating employment	
							10. Perform basic parliamentary procedures in a group meeting	
							Other:	